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FINAL REPORT

(JULY, 1978)

REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH

SOLID WASTE MANAGEMENT - TRICIL CONTRACT

TRANSPORTATION STUDY

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REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH

SOLID WASTE MANAGEMENT - TRI-CIL CONTRACT

TRANSPORTATION STUDY

1) INTRODUCTION

In December, 1977, the City of Hamilton Traffic Department was requested by the Regional Municipality of Hamilton-Wentworth to undertake a transportation system analysis of the Tri-Cil Contract and its implied Waste Management System. The implied Waste Management System consists of three basic elements. These are; firstly, the collection of waste at the generation points by either a municipal contract, private contractors or private individuals. The second element of the system is the delivery of these wastes to a designated Transfer Station wherein the waste is transferred to a large compactor truck. The third element of the system is the disposal of the waste either through the Solid Waste Reduction Unit (S.W.A.R.U.) or by earth fill. This report provides for the identification, analysis and documentation of the proposed system.

2) TRANSFER STATIONS AND TRIP GENERATION

a) Dundas Transfer Station

The Dundas Transfer Station is located on the west side of Olympic Drive across from the existing Ontario Hydro Station. Figures 1 and 2 indicate the location and layout of this station. It has been estimated that there will be approximately 5 transfer trucks utilizing the Glanbrook Land Fill Site originating from the Dundas Transfer Station. These trucks will contain compacted refuse to be hauled to the Land Fill Site.

In order to determine the estimated trip generation of various vehicle types to this Transfer Station, field sheets collected from the existing Sanitary Land Sites in 1976 were analyzed with the results shown in Tables I and II. In sumary, it is estimated that on an average day, there will be 169 vehicles entering this station of which 160 vehicles or 95% of the traffic will be individuals in passenger automobiles or light ½ ton pick-ups. It has been estimated that these vehicales will have virtually no impact on the capacity of the street system leading to this Transfer Station. The vehicles using the Dundas Transfer Station are those which are now using the existing Flamboro, Ancaster and Beverly Sanitary Land Fills and therfore, use a variety of streets leading to Olympic Drive. In addition, all Heavy Commercial and Municipal trucks using the existing Ancaster Land Fill site will be routed to the Mountain Transfer Station. The remaining vehicles are split 50/50 between the Dundas Transfer Station and the Mountain Transfer Station.

b) S.W.A.R.U. - Kenora Transfer Station

The Kenora Transfer Station is situated on the west side of Centennial Parkway immediately north of the C.N.R. Main Line and east of S.W.A.R.U. Figures 3 and 4 indicate the location and layout of this station. It has been estimated that there will be 47 transfer trucks per day going from the Transfer Station to the Glanbrook Land Fill Site.

The original concept was that all lower City of Hamilton and Town of Stoney Creek vehicles would utilize this Transfer Station. Utilizing the 1976 inventory counts conducted at the Stoney Creek and Upper Ottawa Sanitary Land Fills and S.W.A.R.U., various trip generation figures were derived. During the third week in June, 1978, origin studies were conducted at the Upper Ottawa Sanitary Land Fill. Having established a percentage diversion between traffic originating in the lower City of Hamilton and across the Hamilton Mountain, these percentages were the applied to the 1976 inventory counts conducted at this land fill site. All existing traffic originating in the lower City or Stoney Creek were assigned to this Transfer Station.

In a letter dated December 6, 1977, Proctor and Redfern indicated their catchment areas would include the same boundaries. Population trends may however change, thus resulting in more traffic at the Upper Ottawa - Rymal Road Transfer Station as the Mountain population and employment grows.

This report will analyze peak traffic and average traffic at the Kenora Transfer Station and the Upper Ottawa Transfer Station using the following criteria:

OPTION I: No small private vehicles at the Kenora Transfer Station, all these vehicles would go to the Mountain Transfer Station.

OPTION II: No restrictions on small private vehicles either at the Kenora Transfer Station or the Mountain Transfer Station.

OPTION III: No small private vehicles at the Kenora Transfer Station except Saturdays and holidays, all other days they are to use the Mountain Transfer Station.

Tables III, IV, V, VI, VII, VIII and IX, identify these trip distributions and assignments.

Option III will be discussed in three stages. They are as follows:

-Monday to Friday exluding holidays

-Saturdays

-Holidays

The tabulations indicate that on an average day, there will be 207 trucks entering the Kenora Transfer Station if no individual or private vehicles were allowed to enter. Even under peak conditions, the maximum daily truck inflow would reach only 270 trucks with approximately 35% of this volume being municipal trucks. The street system leading to this transfer station is capable of handling this volume of traffic.

Within Option II, wherein all vehicles are allowed access to this station, the volumes increase significantly. On the average day, 338 vehicles would enter and on peak day conditions, 516 vehicles would enter the site daily. The difference in volumes is small individual private vehicles and passenger cars.

Since these vehicles are generated below the escarpment, it is recommended that initially Option II (no restrictions) be implemented since the capacity of Barton Street and Highway #20 is such that these vehicles can be accomodated. This is in order to avoid routing all of these vehicles up the Mountain and down Ottawa Street. It is also recommended that if operational problems arise and persist, within the Kenora Transfer Station, due to the smaller vehicles that Option III be implemented until such time as additional capacity and handling facilities can be constructed. Although the capacity analysis indicates no severe problems, Barton Street is currently showing a high traffic growth rate and it is therefore recommended that the section of Barton Street between Nash Road and Highway #20 be monitored to pinpoint the need for left turns at Kenora Avenue.

c) Mountain Transfer Station

The Mountain Transfer Station is located on the southside of Rymal Road, east of the proposed Upper Ottawa Street southerly extension. Figures 5 and 6 indicate the location and layout of this station.

There will be an estimated 11 transfer trucks coming from this Transfer Station to the Glanbrook Land Fill Site daily. Utilizing the 1976 inventory sheets from the Upper Ottawa, Glanford, Binbrook, Ancaster and Stoney Creek Sanitary Land Fill Sites, various trip generation figures were derived. The existing Upper Ottawa Sanitary Land Fill traffic was split according to figures derived from during the study conducted in June, 1978. In a letter dated December 6, 1977, Proctor and Redfern indicated their catchment areas would basically follow the escarpment. This report analyzes peak traffic and average traffic at the Mountain Transfer Station using the same guidelines as detailed in Section 2(b) of this report. Tables X, XI, XII, XIII, XIV, XV and XVI indicate these trip generations and assignments.

The data indicates that if private vehicles are restricted from Kenora, then the average volume entering would be 496 vehicles and the peak flow would be 919 daily. Although the street system is able to accommodate this vehicular flow, approximately half of these vehicles must travel a long way from below the escarpment. As noted previously, it is recommended that this be avoided. Accordingly, if all vehicles are allowed access to the Kenora Transfer Station, then the average number of vehicles entering the Upper Ottawa Site is 393, and the peak is 702 vehicles per day. It should be noted that under either option, a significant proportion (84% with Option I and 78% with Option II) of the vehicles are individual private vehicles as distinct from the larger commercial trucks.

3) GLANBROOK LAND FILL SITE

The Glanbrook Land Fill Site is located on the north side of the Hamilton-Wentworth Regional Town Line approximately one mile east of Highway #56. Figure 7 identifies the location of this site. The transfer trucks from the various Transfer Stations will unload the compacted refuse at this site. There will be an estimated 63 trucks (126 trips/day) utilizing the Land Fill Site from the various transfer stations. However, should S.W.A.R.U. close down due to mechanical failure, an additional 19 transfer trucks will go to the Glanbrook Land Fill Site from the Kenora Transfer Station. It should be noted that no private or commercial vehicles are to enter the Glanbrook Land Fill Site except Tri-Cil transfer trucks.

4) PROPOSED TRANSFER TRUCK ROUTING (TRI-CIL VEHICLES ONLY)

In addition to trip generation and distribution, an analysis of the proposed routing of these Tri-Cil transfer trucks was also conducted. In a letter dated April 18, 1978, from Tri-Cil Limited to the Regional Municipality of Hamilton-Wentworth, the following is noted:

"Heavy tractor-trailer units suitable for licensing up to 109,000 lbs. Gross Vehicle Weight will be used. These trucks will have a capacity of approximately 75 cubic yards and will consist of tri-axle units."

The letter also indicates the following tractor-trailer routes from each Transfer Station to the Land Fill Site in Glanbrook. They are as follows:

a) Routing from the Dundas Transfer Station:

The tractor-trailers will take the following route:

Olympic Drive to Cootes Drive, from Cootes Drive to Main Street West in Hamilton, Main Street West to Highway #403 eastbound, from Highway #403 to the Queen Elizabeth Way southbound, from Q.E.W. to Highway #20, from Highway #20 to Highway #56, from Highway #56 to the Hamilton-Wentworth - Haldimand - Norfolk Town Line to the Glanbrook Land Fill Site.

b) Routing from the Kenora Avenue Transfer Station:

The tractor-trailers will take the following route:

Highway #20 to Highway #56, from Highway #56 to the Hamilton-Wentworth - Haldimand-Norfolk Town Line to the Glanbrook Land Fill Site.

c) Routing from the Mountain Transfer Station at Rymal and Upper Ottawa:

The tractor-trailers will take the following route:

Rymal Road (Highway #53) to Highway #56, from Highway #56 to the Hamilton-Wentworth - Haldimand-Norfolk Town Line to the Glanbrook Land Fill Site. Figure 8 indicates the number of daily tractor-trailer trips and the routes to be taken by the vehicles.

5) <u>VOLUME/CAPACITY ANALYSIS OF PROPOSED ROUTING OF TRANSFER VEHICLES</u>

In order to fully realize the implication of the Transfer Vehicles on the existing routes, volume and capacity analysis were undertaken to determine the impact, if any, on the capacity of the roadways carrying the increased truck traffic.

Table XI provides a sectional analysis of volumes and capacities. It should be noted that the operating hours of the Transfer Stations for receiving wastes must agree with the Tri-Cil Contract. The are: 8:00 A.M. to 6:00 P.M. on all days except Sundays, Christmas Day and New Year's Day as well as such statutory holidays as may be negotiated.

The transfer vehicle trips were then assumed to be distributed evenly during the 10 hour day of operation.

It can be seen from Table XVII that the percentage increase in truck traffic is very marginal. This also reflects the nominal impact these trucks will have on the capacity of the subject road links. It should be noted that Centennial Parkway between the Q.E.W. and King Street is approaching its capacity in P.M. peak hour peak direction. In addition to the volume/capacity analysis, volume counts were recently conducted at Highway #56 and Highway #53, Regional Road 22 and Highway #56 and Haldimand-Norfolk Town Line and Highway #56. Summaries of these volume counts are tabulated in Tables XII, XIII, XIV, XVIII, XIX and XX. Volume counts were also conducted at the intersection of Barton and Kenora in 1977 and are summarized in Table XXI.

6) ACCIDENT RATE ANALYSIS

An accident rate analysis was also conducted on the subject road links including Highway #20 (Centennial Parkway) from Q.E.W. to Highway #53, Highway #53 to the Haldiman-Norfolk Town Line. The Ministry of Transportation and Communications were unable to furnish 1977 data, at the time of this study, for the subject road links presently in their jurisdiction. Accordingly, 1975 and 1976 data was utilized.

Table XXII summarizes this information. These figures do not include signalized intersection accident rates but only those sections of roadway between signalized intersections.

7) SCHOOL BUS ROUTING (For Information Only)

School bus routing was also investigated to determine the number of school buses and bus stops which may affect the Tri-Cil Transfer Trucks. McLeod Motors and Wills Motors generally run the bus routes on the subject road links. The information received is for the 1977-1978 school year. It was indicated by the busing companies that these schedules could change drastically at the commencement of the 1978-1979 school year. The school bus stops are as follows:

a) Highway #56 (Highway #53 to the Haldimand-Norfolk Town Line)
   - 71 bus stops/day (including morning, noon and afternoon)

b) Highway #53 (Upper James to Highway #56)
   - 24 bus stops/day

c) Highway #20 (Barton Street to Highway #53)
   - 48 bus stops/day

There may be more bus stops at night to transfer home the late students involved in extracurricular activities at the school. These stops vary by the day and virtually impossible to accurately note.

8) LAND USE

The Regional Municipality of Hamilton-Wentworth has already conducted a Land Use Study for the areas affected by the Tri-Cil Transfer Trucks. The information has already been forwarded to the Proctor and Redfern Group. It will again be discussed in this report but in a more general form. The information to be presented in this report was taken from 1974 aerial photographs of the subject areas and therefore the figures given should be considered approximations only.

The land uses are as follows:

a) Highway #56 (Town Line to Regional Road #22)
   -approximately 63 homes - primarily agricultural and residential

b) Highway #56 (Regional Road #22 to Highway #53)
   -approximately 67 homes - primarily residential and agricultural

c) Highway #20 (Highway #53 to King Street)

-approximately 25 homes - primarily residential and agricultural

d) Highway #20 (King Street to Queen Elizabeth Way)

-approximately 61 residential units - majority of land abutting this roadway is used for commercial purposes (taken from Vernons Directory)

e) Highway #53 (Upper Ottawa to Highway #56)

-approximately 66 homes - mixed industrial and commercial

SUMMARY

The purpose of this report was to present information to the Regional Municipality of Hamilton-Wentworth, define, analyze and document the impacts of the proposed Solid Waste Management System. The information contained in this report with respect to traffic volumes and the number of accidents is taken from files contained in the City of Hamilton Traffic Department and the information supplied by the Ministry of Transportation and Communications. On the basis of our analysis, we are of the opinion the the actual effect on the operation of the roadways carrying the additional traffic volumes will not be a detrimental one. We are satisfied that from a Traffic Engineering point of view, adequate capacity is available on the road network to safely and efficiently handle the additional volumes generated by the system. Although not directly addressed herein, there has been no attempt to project the impacts of the system into the future due primarily to the slow growth rate (less than 2%) in waste generating sources and the relatively short life of the Tri-Cil Contract. However, our basic conclustions remain valid to the end of this planning horizon.

Information still to be submitted but not tabulated at report date:

-hourly variation by vehicle type including municipal, private and commercial uses.

SUMMARY OF TABLES AND FIGURES

TABLE I

Estimated 1976 Trips to Dundas Transfer Station

Based on Average day/month (1976)

Month	DAP	SAP	T20+	T20	½T	CT	CSW	Total
January	1	4	1	2	70	21	46	145
February	2	9	1	4	76	15	47	154
March	1	5	0	2	70	16	45	139
April	1	4	0	2	116	35	79	237
May	1	5	1	2	92	34	64	199
June	1	4	1	4	99	50	71	230
July	0	4	1	3	103	39	63	213
August	1	3	3	3	70	30	49	159
September	0	3	0	2	59	25	43	132
October	0	4	1	3	62	26	35	131
November	0	4	1	2	73	24	39	143
December	0	5	2	2	69	22	41	141
Average per year	1	5	1	2	80	28	52	169

DAP - Double Axle Packer
SAP - Single Axle Packer
T20+ - Trucks over 20 yards including trucks with fillable cover and with felt foam
T20 - Trucks under 20 yards with GVW over 7,000 lbs.
½T - ½ ton trucks
CT - Cars with Trailers
CSW - Cars and Station Wagons

TABLE II

Estimated 1976 trips to Dundas Transfer Station

Based on Peak day per month (Saturdays)

Month	DAP	SAP	T20+	T20	½T	3T	CSW	Total
January	0	1	0	1	129	35	104	270
February	0	1	0	1	139	39	127	307
March	0	0	1	1	171	51	96	320
April	0	0	1	2	239	95	167	504
May	0	0	0	2	253	111	174	540
June	0	0	0	2	169	78	95	344
July	0	1	0	3	164	83	126	377
August	0	0	0	4	117	31	96	248
September	0	0	0	1	102	49	59	211
October	0	7	0	6	105	81	83	282
November	0	0	0	5	127	85	54	270
December	1	8	1	2	122	106	121	361
Average peak day	0	1	0	2	153	70	108	336

TABLE III

1976 Estimated Trips to Kenora Transfer Station — Option #1 - no small private vehicles at Kenora

Average Day/Month

Month	DAP	SAP	T20+	T20	½T	Municical Trucks (SWARU)	Stoney Creek (municipal)	Total vehicle
January	10	1	43	19	12	38	4	127
February	13	2	51	32	15	45	2	160
March	14	2	82	37	13	57	1	206
April	16	2	158	45	24	54	3	302
May	14	4	142	37	23	47	2	269
June	15	13	102	42	19	44	5	240
July	13	1	63	31	16	43	4	171
August	12	6	51	36	13	52	1	171
September	14	1	56	43	22	42	4	182
October	13	0	62	47	19	50	3	194
November	16	0	74	45	22	53	1	211
December	20	2	98	46	19	60	1	246
Average Day per year	14	3	82	38	18	49	3	207

TABLE IV

1976 Estimated Trips to Kenora Station — Option #2 - no restrictions at Kenora

Average Day per Month

Month	DAP	SAP	T20+	T20	½T	Ct	CSW	Municipal Trucks (SWARU)	Stoney Creek Municipal	To ve
January	10	1	43	19	64	5	31	38	4	21
February	13	2	51	32	76	8	33	45	2	26
March	14	2	82	37	66	9	24	57	1	29
April	16	2	158	45	117	23	59	54	3	47
May	14	4	142	37	115	27	49	47	2	43
June	15	13	102	42	94	27	43	44	5	38
July	13	1	63	31	81	23	32	43	4	29
August	12	6	51	36	65	27	30	52	1	28
September	14	1	60	37	79	42	20	42	4	29
October	13	0	62	47	94	52	43	50	3	36
November	16	0	74	45	112	44	34	53	1	37
December	20	2	98	46	92	32	28	60	1	37
	14	3	82	38	88	27	36	49	3	33

TABLE V

1976 Estimated Trips to Kenora Transfer Station — Option # 1 - no small vehicles at Kenora

Peak Day per Month

MONTH	CAP	SAP	T20+	T20	HT	City of Hamilton Municipal	Stoney Creek Municipal	Total Vehicles
January	17	2	71	33	21	98	3	245
February	10	3	73	43	23	82	6	240
March	22	3	167	56	22	93	3	366
April	6	0	33	42	59	92	3	235
May	2	1	8	35	54	85	3	188
June	11	14	26	58	29	86	3	227
July	21	2	120	41	19	85	6	294
August	15	0	72	35	18	107	5	252
September	18	0	74	51	25	69	3	240
October	18	0	65	58	28	86	3	258
November	15	0	81	61	28	132	3	320
December	33	3	120	68	24	122	1	371
Average Peak Day	16	2	76	48	29	95	4	270

TABLE VI

1976 Estimated Trips to Kenora Transfer Station — Option # 2 - no restrictions on vehicles at Kenora

Peak Day per Month

MONTH	DAP	SAP	T20+	T20	½T	CT	CSW	City of Hamilton Municipal	Stoney Creek Municipal	Tot veh
January	17	2	71	33	103	12	63	98	3	402
February	10	3	73	43	117	10	50	82	6	394
March	22	3	168	56	109	18	44	93	3	516
April	6	0	33	42	295	80	151	92	3	702
May	2	1	8	35	269	102	47	85	3	652
June	11	14	26	58	147	69	91	86	3	500
July	21	2	120	41	95	33	31	85	6	434
August	15	2	72	35	87	71	63	107	5	457
September	18	0	71	51	126	84	82	69	3	504
October	18	0	65	58	141	74	51	86	3	496
November	15	0	81	61	143	59	56	132	3	550
December	33	3	120	68	121	52	57	122	1	577
Average Peak Day	16	2	76	48	146	55	74	95	4	516

TABLE VII

1976 Estimated Trips to Kenora Transfer Station

Option #3
No restrictions on small private vehicles on Saturdays and Holidays

Average Day/Month Monday - Friday (except holidays)

Month	DAP	SAP	T20+	T20	½T	Municipal Trucks (SWARU)	Stoney Creek Municipal	Total vehicles
January	10	1	43	19	12	38	4	127
February	13	2	51	32	15	45	2	160
March	14	2	82	37	13	57	1	206
April	16	2	158	45	24	54	3	302
May	14	4	142	37	23	47	2	269
June	15	13	102	42	19	44	5	240
July	13	1	63	31	16	43	4	171
August	12	6	51	36	13	52	1	171
September	14	1	56	43	22	42	4	182
October	13	0	62	47	19	50	3	194
November	16	0	74	45	22	53	1	211
December	20	2	98	46	19	60	1	246
Average day per year	14	3	82	38	18	49	3	207

TABLE VIII

1976 Estimated Trips to Kenora Transfer Station

Option # 3
No restrictions on small private vehicles on Saturdays Holidays

Peak Day per Month — Monday - Friday (except Holidays)

Month	DAP	SAP	T20+	T20	½T	City of Hamilton Municipal	Stoney Creek Municipal	Total Vehicles
January	17	2	71	33	21	98	3	245
February	10	3	73	43	23	82	6	240
March	22	3	167	56	22	93	3	366
April	6	0	33	42	59	92	3	235
May	2	1	8	35	54	85	3	188
June	11	14	26	58	29	86	3	227
July	21	2	120	41	19	85	6	294
August	15	0	72	35	18	107	5	252
September	18	0	74	51	25	69	3	240
October	18	0	65	58	28	86	3	258
November	15	0	81	61	28	132	3	320
December	33	3	120	68	24	122	1	371
Average Peak Day	16	2	76	48	29	95	4	270

TABLE IX

1976 Estimated Trips to Kenora Transfer Station

Saturdays

Average Saturday/ Month

Option #3
No restrictions on small private vehicles on Saturdays and Holidays

Month	DAP	SAP	T20+	T20	½T	CT	CSw	Total
January	5	1	25	8	65	4	30	138
February	5	0	18	13	79	8	33	156
March	6	1	19	11	62	6	21	126
April	5	1	26	25	158	24	50	289
May	16	0	22	17	133	55	52	295
June	6	6	27	23	97	33	51	243
July	4	0	13	8	70	22	32	149
August	3	1	10	15	57	27	30	143
September	3	0	9	11	66	43	41	173
October	4	1	12	14	86	59	41	217
November	5	0	11	20	123	56	38	253
December	3	1	20	11	66	23	28	152
Aug/Sat year	5	1	18	15	89	30	37	195
Peak Sat. /year	16	0	22	17	133	55	52	295

TABLE X

Estimated 19,6 Trips to Mountain Transfer Station

Based on Average Day per Month

Option # 1
No small private vehicles at Kenora

Month	DAP	SAP	T20+	T20	½T	CT	CSW	City of Hamilton Municipal	Glanbrook Municipal	Total Vehicles
January	6	4	14	9	121	8	137	76	1	376
February	5	5	14	15	142	21	144	43	1	390
March	6	5	7	17	133	25	118	31	1	343
April	6	6	18	23	222	58	262	57	1	653
May	5	7	17	23	219	74	211	51	1	608
June	7	5	10	20	173	83	198	65	1	562
July	6	5	8	16	141	79	142	54	1	452
August	6	5	13	15	124	96	137	41	1	438
September	6	5	8	17	141	127	91	67	1	463
October	7	5	8	21	164	155	181	48	1	590
November	8	5	8	23	207	142	161	41	1	596
December	10	5	8	19	70	98	136	39	1	486
Average day/year	7	5	11	18	163	81	160	51	1	496

TABLE XI

Estimated 1976 Trips to Mountain Transfer Station

Option #2
No restrictions on vehicles at Kenora

Based on Average Day per Month

Month	DAP	SAP	T20+	T20	½T	¾T	CSW	City of Hamilton Municipal	Glanbrook Municipal	Total Vehicles
January	6	4	14	9	112	3	89	76	1	314
February	5	5	14	15	127	12	94	43	1	316
March	6	5	7	17	121	15	81	31	1	284
April	6	6	18	23	194	32	168	57	1	510
May	5	7	17	23	193	43	135	51	1	475
June	7	5	10	20	158	51	128	65	1	445
July	6	5	8	16	126	49	101	54	1	366
August	6	5	13	15	108	63	91	41	1	343
September	6	5	8	17	125	76	62	67	1	367
October	7	5	8	21	146	92	111	48	1	439
November	8	5	8	23	191	88	105	41	1	470
December	10	5	8	19	160	58	90	39	1	390
Average day/year	7	5	11	18	147	49	105	51	1	393

TABLE XII

Estimated 1976 Trips to Mountain Transfer Station — Option #1
No small private vehicles at Kenora

Based on Peak Day Per Month

Month	DAP	SAP	T20+	T20	½T	CT	CSW	CITY OF HAMILTON MUNICIPAL	GLANBROOK MUNICIPAL	TOTAL VEHIC
January	5	1	6	11	277	32	303	85	2	722
February	10	-	6	12	327	36	295	81	1	768
March	17	-	14	19	292	65	224	35	2	668
April	24	-	3	18	599	180	465	67	1	1357
May	12	10	1	24	535	228	528	67	1	1406
June	3	-	3	20	330	214	402	67	1	1040
July	10	7	12	20	244	109	176	71	2	651
August	8	6	46	13	221	237	316	64	2	913
September	9	8	23	21	259	227	311	86	2	946
October	4	-	8	19	295	234	258	53	2	873
November	5	-	15	26	341	208	209	90	2	896
December	8	-	10	23	312	173	220	35	2	783
Average Peak day per year	10	3	12	19	336	162	309	67	2	919

TABLE XIII

Estimated 1976 Trips to Ottawa Street Transfer Station

Option # 2
No restrictions on
Vehicles at Kenora

Based on Peak Day per Month

Month	DAP	SAP	T20+	T20	½T	CT	CSW	CITY OF HAMILTON MUNICIPAL	GLANBROOK MUNICIPAL	TOTAL VEHICLES
January	5	1	6	11	217	20	240	85	2	587
February	10	-	6	12	254	26	245	81	1	635
March	17	-	14	19	278	47	180	35	2	542
April	24	-	3	18	408	100	342	67	2	964
May	12	10	1	24	358	126	381	67	2	981
June	3	-	3	19	243	155	311	67	2	803
July	10	7	12	20	188	76	146	71	2	532
August	8	6	46	13	169	166	253	64	2	727
September	9	8	23	21	179	143	229	86	2	700
October	4	-	8	19	204	160	207	53	2	657
November	5	-	15	26	255	149	153	90	2	695
December	8	-	10	23	241	121	163	85	2	603
Average Peak Day	10	3	12	19	245	107	238	67	2	702

TABLE XIV

Estimated 1976 Trips to Mountain Transfer Station

Based on Average Day per Month

Monday to Friday (except holidays)

Option # 3
No restrictions on small private vehicles at Kenora on Saturday and Holidays

Month	DAP	SAP	T20+	T20	½T	CT	CSW	City of Hamilton Municipal	Glanbrook Municipal	Total Vehicles
January	6	4	14	9	121	8	137	76	1	376
February	5	5	14	15	142	21	144	43	1	390
March	6	5	7	17	133	25	118	31	1	343
April	6	6	18	23	222	58	262	57	1	653
May	5	7	17	23	219	74	211	51	1	608
June	7	5	10	20	173	83	198	65	1	562
July	6	5	8	16	141	79	142	54	1	452
August	6	5	13	15	124	96	137	41	1	438
September	6	5	8	17	141	127	91	67	1	463
October	7	5	8	21	164	155	181	48	1	590
November	8	5	8	23	207	142	161	41	1	596
December	10	5	8	19	170	98	136	39	1	486
Average day per year	7	5	11	18	163	81	160	51	1	496

TABLE XV

Estimated 1976 Trips to Mountain Transfer Station

Based on peak Day per Month

Monday to Friday (except holidays)

Option #3
No restrictions on small private vehicles at Kenora on Saturdays and Holidays

Month	DAP	SAP	T20+	T20	½T	CT	CSW	CITY OF HAMILTON MUNICIPAL	GLANBROOK MUNICIPAL	TOTAL VEHICLES
January	5	1	6	11	277	32	303	85	2	722
February	10	-	6	12	327	36	295	81	1	768
March	17	-	14	19	292	65	224	35	2	668
April	24	-	3	18	599	180	465	67	1	1357
May	12	10	1	24	535	228	528	67	1	1406
June	3	-	3	20	330	214	402	67	1	1040
July	10	7	12	20	244	109	176	71	2	651
August	8	6	46	13	221	237	316	64	2	913
September	9	8	23	21	259	227	311	86	2	946
October	4	-	8	19	295	234	258	53	2	873
November	5	-	15	26	341	208	209	90	2	896
December	8	-	10	23	312	173	220	35	2	783
Average Peak day per year	10	3	12	19	336	162	309	67	2	919

TABLE XVI

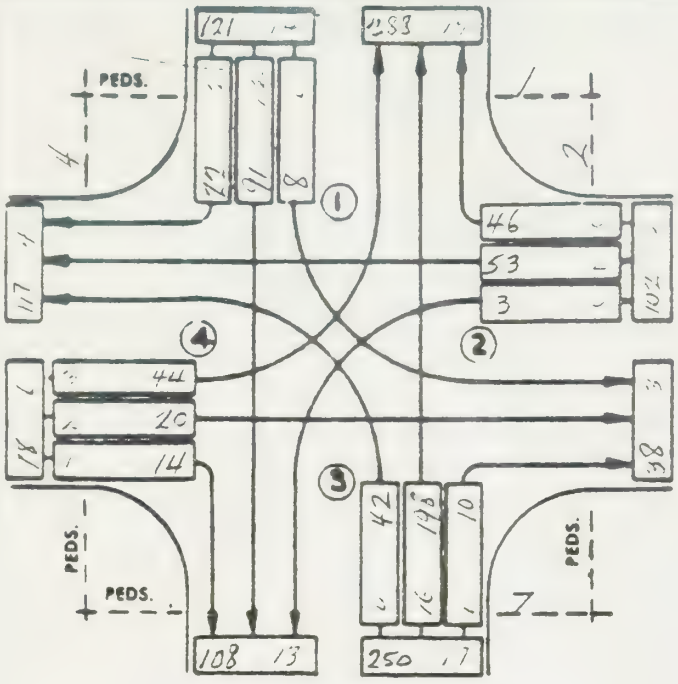
Estimated 1976 Trips to Mountain Transfer Station

Option #3
No restrictions on small private vehicles at Kenora on Saturdays and Holidays

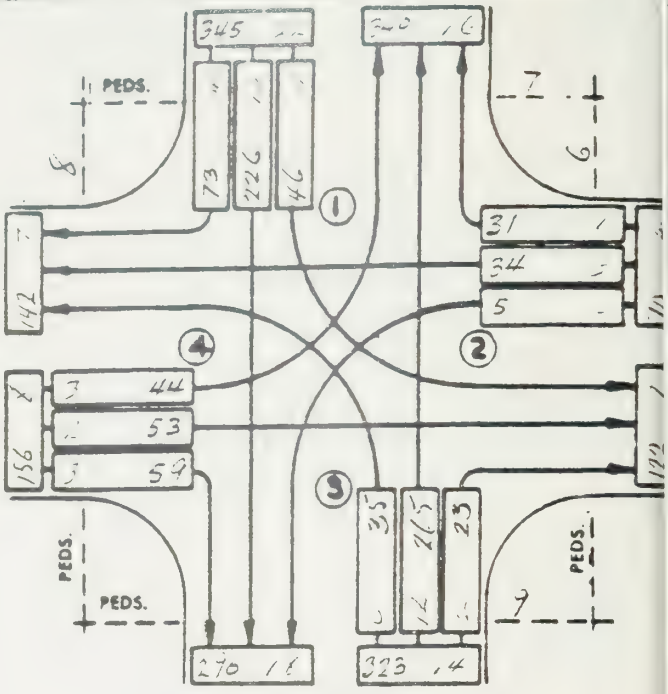
Monthly Average (Saturday)

Month	DAP	SAP	T20+	T20	½T	CT	CSW	Total
January	1	-	2	4	190	17	194	408
February	7	-	2	5	249	47	238	548
March	11	-	2	5	233	41	183	475
April	15	1	2	12	416	107	343	896
May	13	3	6	13	390	186	361	972
June	2	-	2	11	247	125	251	638
July	11	1	4	4	176	92	157	435
August	2	2	13	6	161	108	179	471
September	1	-	4	5	158	113	193	474
October	1	-	3	5	218	160	192	579
November	4	-	4	10	297	170	196	681
December	1	-	2	5	209	92	177	486
Average day per year	5	1	4	7	245	105	222	589
Average peak Sat.	13	3	6	13	390	186	361	972

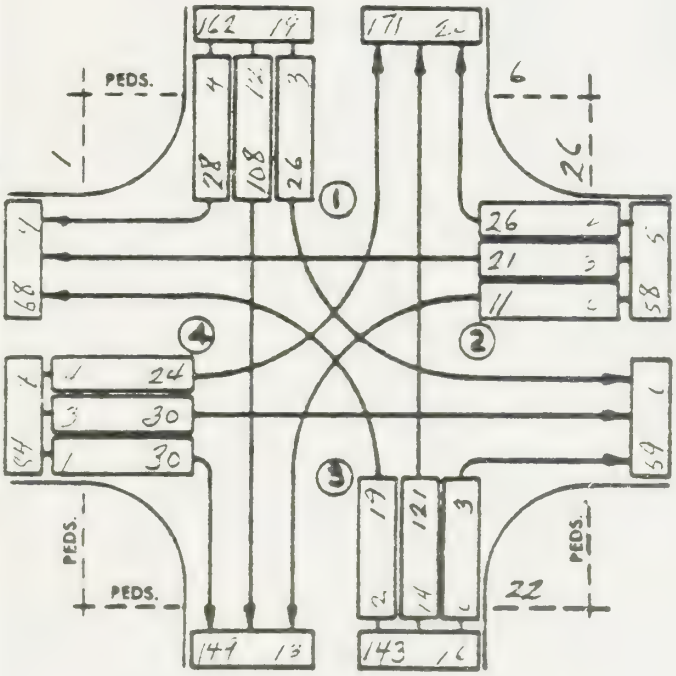
SECTION	AVERAGED 1977 P.M. PEAK HOUR VOLUMES	AVERAGED 1977 P.M. PEAK HOUR VOLUMES PK DIRECTION	AVERAGED % TRUCK EXISTING 7 HR COUNT	(10 HR. DAY FOR SWM TRUCKS) % TRUCKS INCLUDING TRANSFER VEHICLES	CAPACITY/ DIRECTION EXISTING	CAPACITY/ DIRECTION WITH TRANSFER VEHICLES	#LANES IN EACH DIRECTION	AVERAGED EXISTING AWOT *
Centennial Parkway (Q.E.W. to King St.) (1.9 miles)	2111	1348	8.20	9.00	1432	1430	2	23294
HWY.#20 King St. to HWY.#53 (3.1 miles)	1742	1068	10.40	11.34	2227	2114	2	17500 volum M.T.C.on 1976 HWY20 Volumes -hill
HWY. #53 Up. Ottawa to HWY.56 (2.3 miles)	834	450	10.67	10.83	892	883	1	9800 1976 M.T.C. Manual
HWY.#56 (HWY. 53 to RR 22) (3.9 miles)	774	389	9.25	11.66	880	858	1	7000 1976 M.T.C. Manual
HWY. #56 (RR 22 to Ham.-Went. County Line) (3.5 miles)	601	320	7.25	10.73	880	858	1	4350 1976 M.T.C. Manual



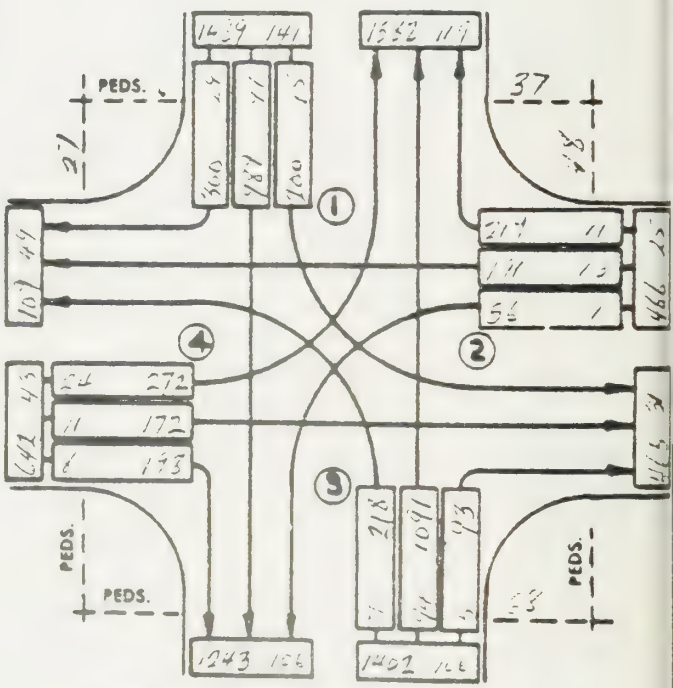
A.M. PEAK HOUR 715-815



P.M. PEAK HOUR 415-515



TYPICAL NORMAL HOUR 2-3



7-HOUR TOTAL VOLUME

CITY OF HAMILTON
TRAFFIC FLOW DIAGRAM

ROADWAY Hwy # 56 AT EINE CK & WHITESIDE

Date THU. JUNE 5/13 WEATHER Recapped By

FORM 394

A.A.D.T. FACTOR _____ LOCATION _____

CHECKERS _____ RECAPPED BY _____ DATE _____ 19__

WEATHER _____ ROAD CONDITIONS _____

TIME	NORTH BOUND ON _____ L	S	R	SOUTH BOUND ON _____ L	S	R	EAST BOUND ON _____ L	S	R	WEST BOUND ON _____ L	S	R	TOTAL	PEDESTRIANS S SIDE	N SIDE	W SIDE	E SIDE
6:45																	
7:00																	
7:15	4	32			25	12	7	3	4	2	1	—					
7:30	6	54	3	1	28	5			4		2	3					
7:45	12	58	1	5	21	3	6	2	1		0	3					
8:00	14	54	2	1	15	4	2	—	3		2	2		3		1	
8:15	9	32	4	3	24	3	3	2	3		3	4		1	1	3	2
3:30	11	31	1	3	31	2	1	2	3		9	7			2		
3:45	9	27	2	2	24	6	—	3	2		3	2		1			
9:00	12	25	4	0	22	3	4	1	5		3	3					
9:15	2	29	1	5	33	16	12	2	5	2	4	5					
9:30	7	23		4	26	3	10	1	5	2	4	6		2			
9:45	4	29	3	2	26	11	2	4	3	2	1					1	
10:00	2	16	6	2	29	9	6	1	6	1	3	6		3			
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3:00	6	23		6	32	7	4	3	4	2	2	3		2	3		
3:15	7	31	7	10	30	12	7	6	3	6	2	3		2			
3:30	3	35	2	9	32	13	3	6	3	1	5	6		1		2	1
3:45	7	35	4	13	29	9	4	4	1	3	4	4		5	5		2
4:00	7	34	7	13	37	16	3	2	3	2	3	3		2		3	1
4:15	11	42	3	13	51	17	12	4	5	4	1	9			3	5	
4:30	11	40	5	14	60	12	5	14	10	3	7	11		4	3	3	2
4:45	9	59	6	13	49	22	20	15	20	2	7	3					
5:00	3	91	3	9	59	20	10	6	13		5	6			1		
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5:30	3	31	4	12	42	15	14	17	15	6	5	2			11		
5:45	9	47	7	16	39	15	22	9	17	3	9	14		2	3		2
6:00	8	34	5	9	32	11	16	4	11	1	6	11				2	
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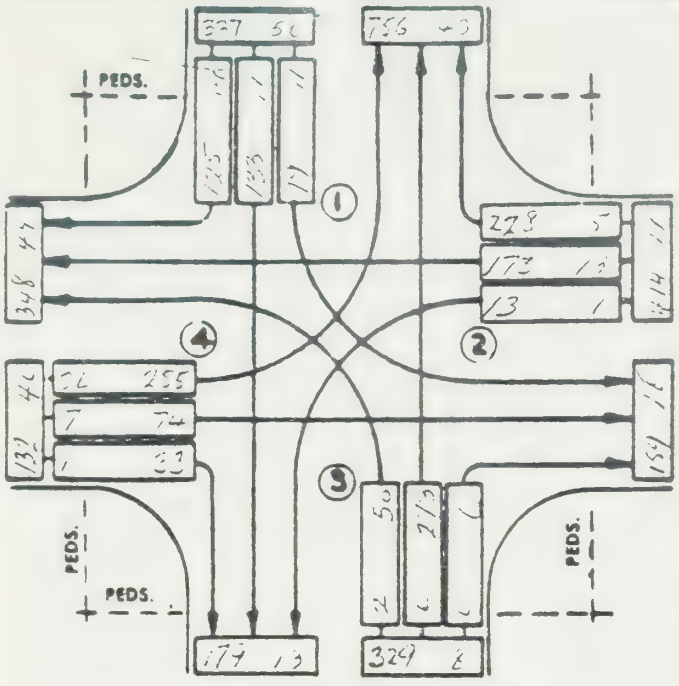
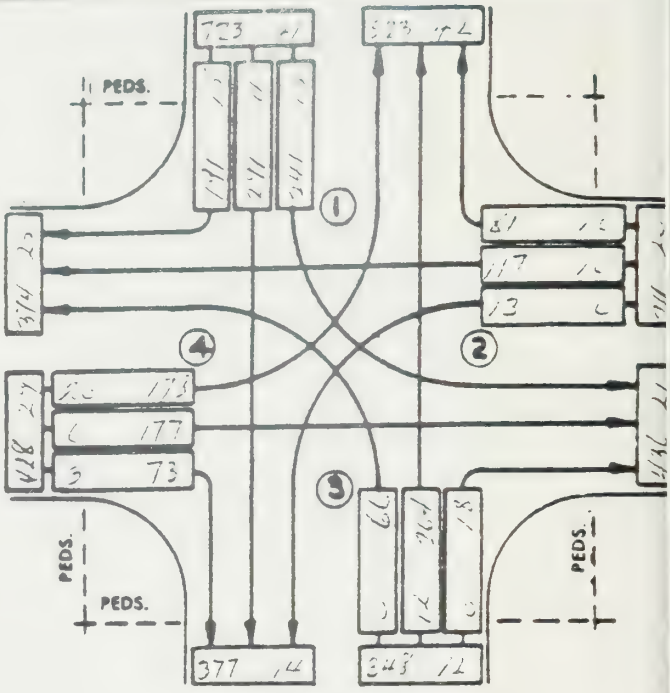
TOTAL																	
TRUCKS																	

TABLE XIX

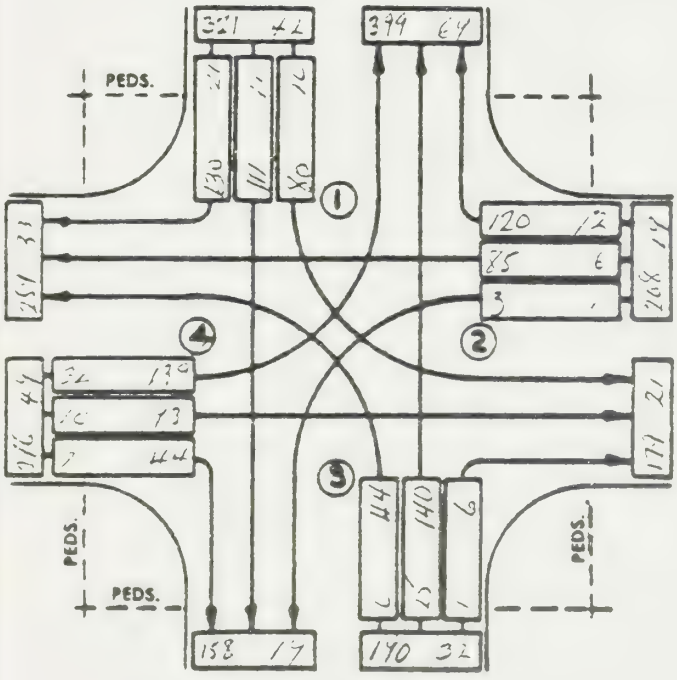
78.06.07



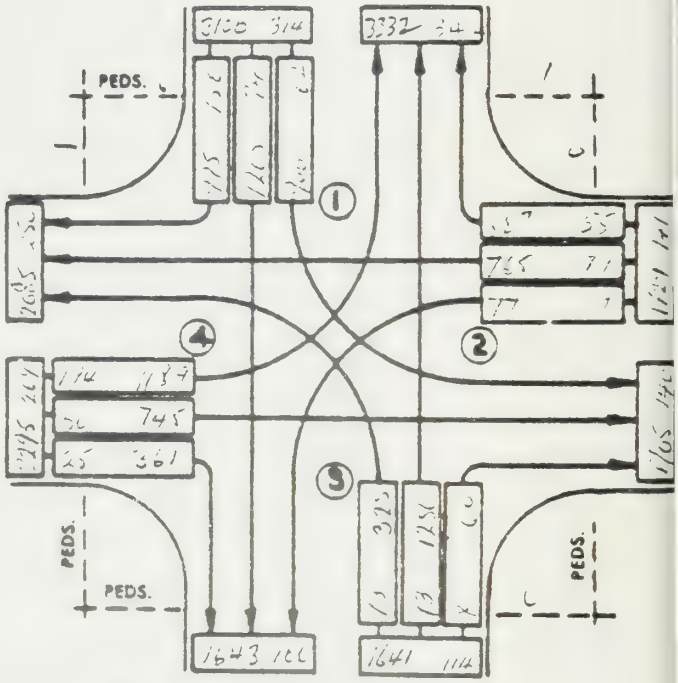
A.M. PEAK HOUR 715 - 815



P.M. PEAK HOUR 415 - 515



TYPICAL NORMAL HOUR 2 - 3



7 HOUR TOTAL VOLUME

CITY OF HAMILTON
TRAFFIC FLOW DIAGRAM

ROADWAY Hwy #20 AT Hwy #527 and Hwy #56

Date TUE JUNE 6/78 WEATHER Recapped By

Form No. 22

FORM 394

A.A.D.T. FACTOR _____ LOCATION _____

CHECKERS _____ RECAPPED BY _____ DATE _____ 19 ____

WEATHER _____ ROAD CONDITIONS _____

TIME	NORTH BOUND ON _____ L	S	R	SOUTH BOUND ON _____ L	S	R	EAST BOUND ON _____ L	S	R	WEST BOUND ON _____ L	S	R	TOTAL	PEDESTRIANS S SIDE	N SIDE	W SIDE	E SIDE
6:45																	
7:00																	
7:15																	
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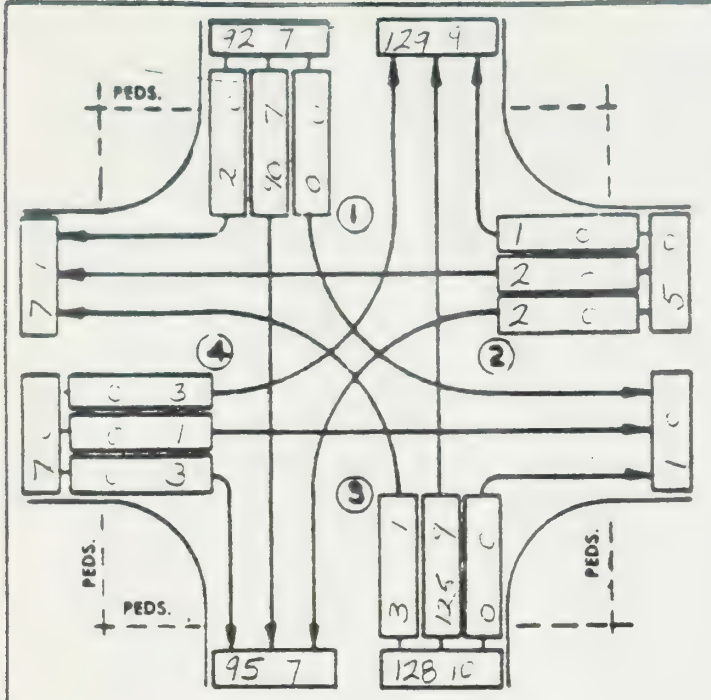
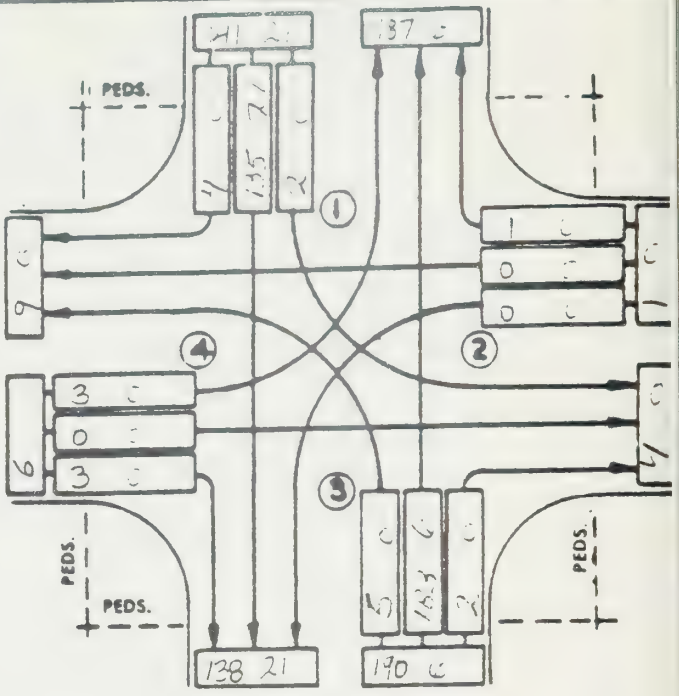
TOTAL																	
TRUCKS																	

TABLE XX

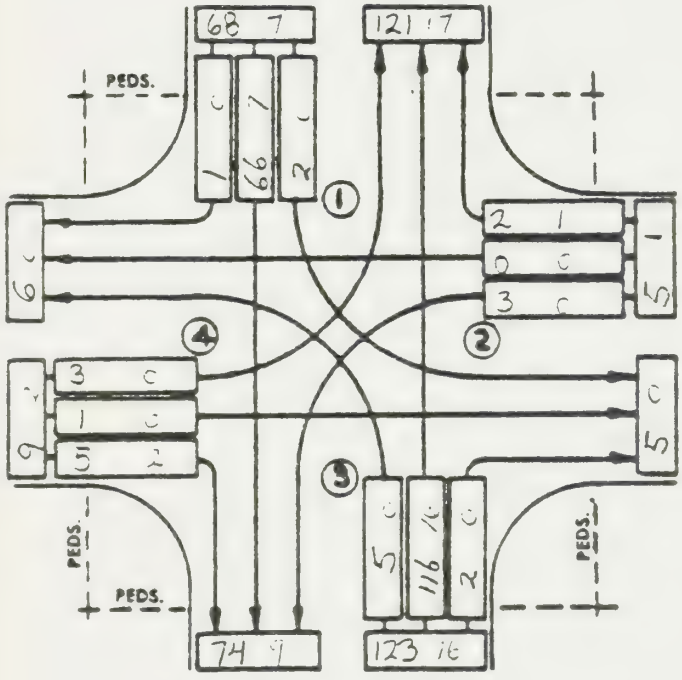
78.05



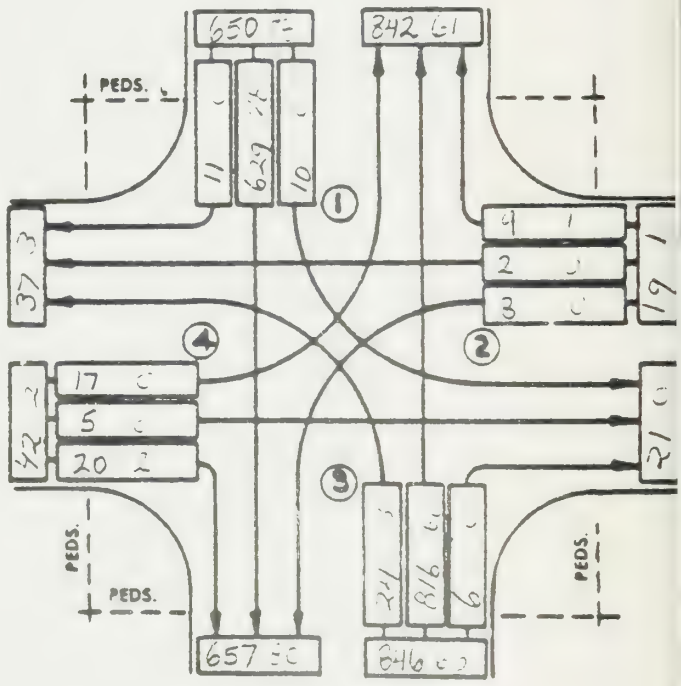
A.M. PEAK HOUR 7:00-8:00



P.M. PEAK HOUR 4:45-5:45



TYPICAL NORMAL HOUR 2-3



7- HOUR TOTAL VOLUME

CITY OF HAMILTON
TRAFFIC FLOW DIAGRAM

ROADWAY HIGHWAY #56 AT [illegible]

Date WEDNESDAY, JUNE 7, 1978 WEATHER RAIN Recapped By

Form No. 2

FORM 394

A.A.D.T. FACTOR _____ LOCATION Hwy 14 & 56 and Town Line

CHECKERS _____ RECAPPED BY _____ DATE Wednesday, June 7 19 75

WEATHER RAIN ROAD CONDITIONS Wet

TIME	NORTH BOUND ON Highway 56 L	S	R	SOUTH BOUND ON Highway 56 L	S	R	EAST BOUND ON Town Line L	S	R	WEST BOUND ON Town Line L	S	R	TOTAL	PEDESTRIANS S SIDE	N SIDE	W SIDE	E SIDE
6:45																	
7:00																	
7:15		36			37	1											
7:30		33			16												
7:45	2	31			17	1											
8:00	1	25			18			2		2							
8:15		26		1	19	1	2										
8:30	1	21			12				1								
8:45		28			21												
9:00		20		1	19		2										
9:15		25			20	1											
9:30		17		1	17												
9:45		22			23												
10:00		25			22												
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1:30																	
1:45																	
2:00																	
2:15		25			13		1										
2:30	1	28			17		2			1							
2:45	1	30	1	1	15	1			1	2		1					
3:00	3	33	1	1	21												
3:15	2	22	1	1	16	1											
3:30		24			23												
3:45	1	30		1	19				1			1					
4:00		21	1		22	1	1				1						
4:15	1	20			23		1										
4:30	4	20			25				1								
4:45	2	34			27		1		1								
5:00	1	38	1	1	40	1	1		1								
5:15	2	28			34	1	1										
5:30		47	1		35				2			1					
5:45	2	40		1	26	2	1										
6:00		37		1	20			1	1								
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6:30																	
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11:30																	
TOTAL																	
TRUCKS	3	60			78												

TABLE XXI

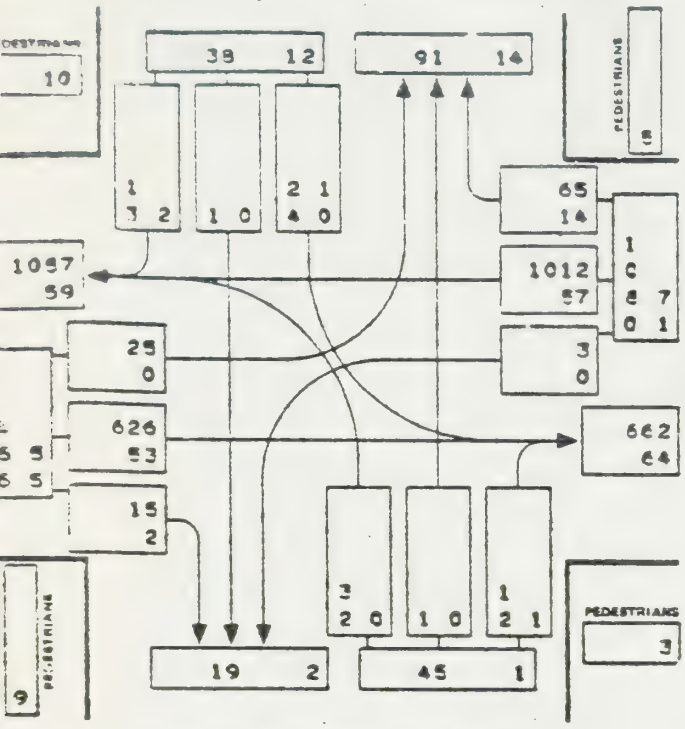
BARTON E AT KENORA

FILE NO.= 48
WEATHER=CLEAR

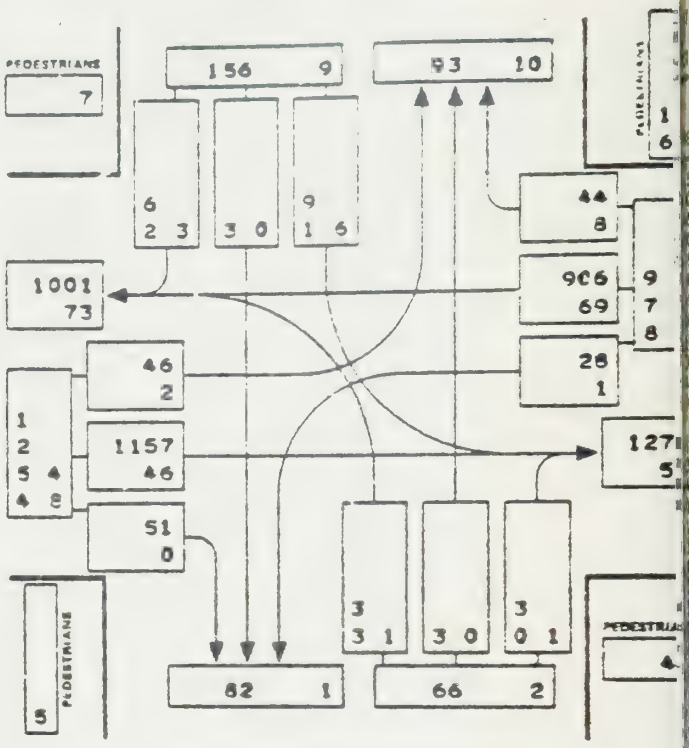
SPECIAL= SIGNAL

MON 29/ 8/77

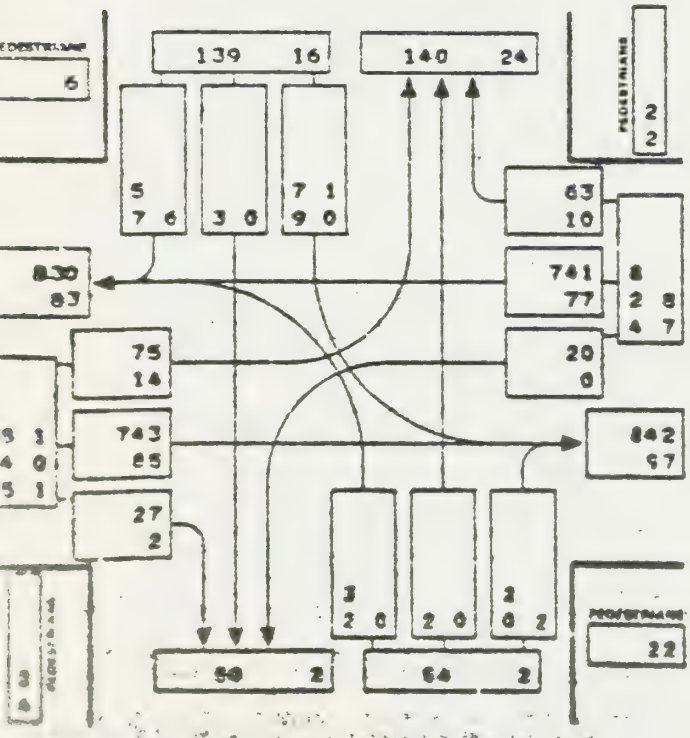
LOC. CODE=13964356
ROAD CONDITIONS=GOOD



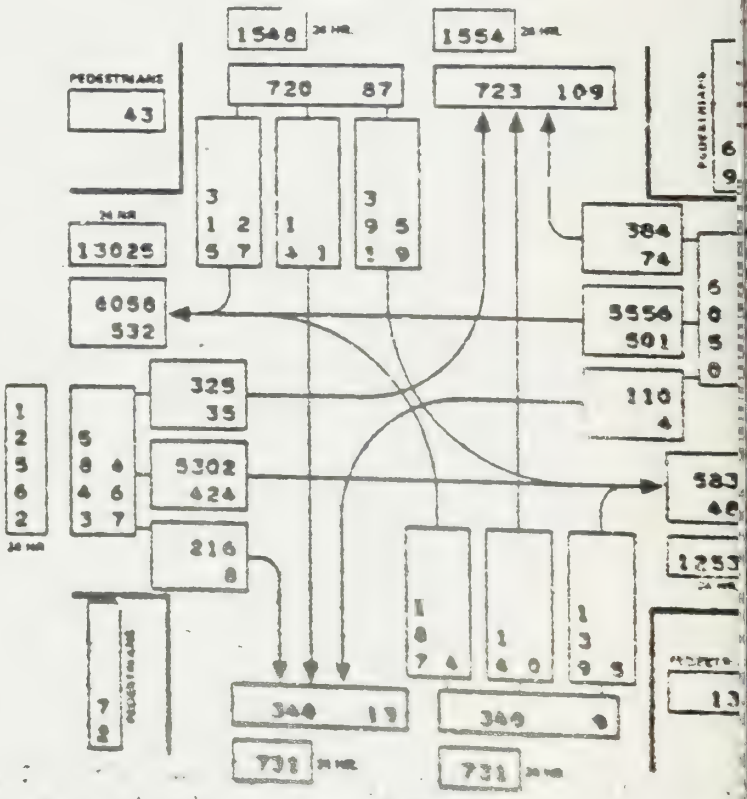
A.M. PEAK HOUR= 7:15- 8:15



P.M. PEAK HOUR= 4:00- 5:00



TYPICAL NORMAL HOUR= 2:00- 3:00



7 HOUR TOTAL VOLUME = ADOT FACTOR=

CITY OF HAMILTON TRAFFIC VOLUMES — TOTAL VEHICLES

ION= BARTON E AT KENORA
FACTOR=2.150
AL= SIGNAL
WEATHER=CLEAR
FILE NO.=48
DATE= MON 29/ 8/77
ROAD CONDITIONS=GOOD
LOCATION CODE=13964356

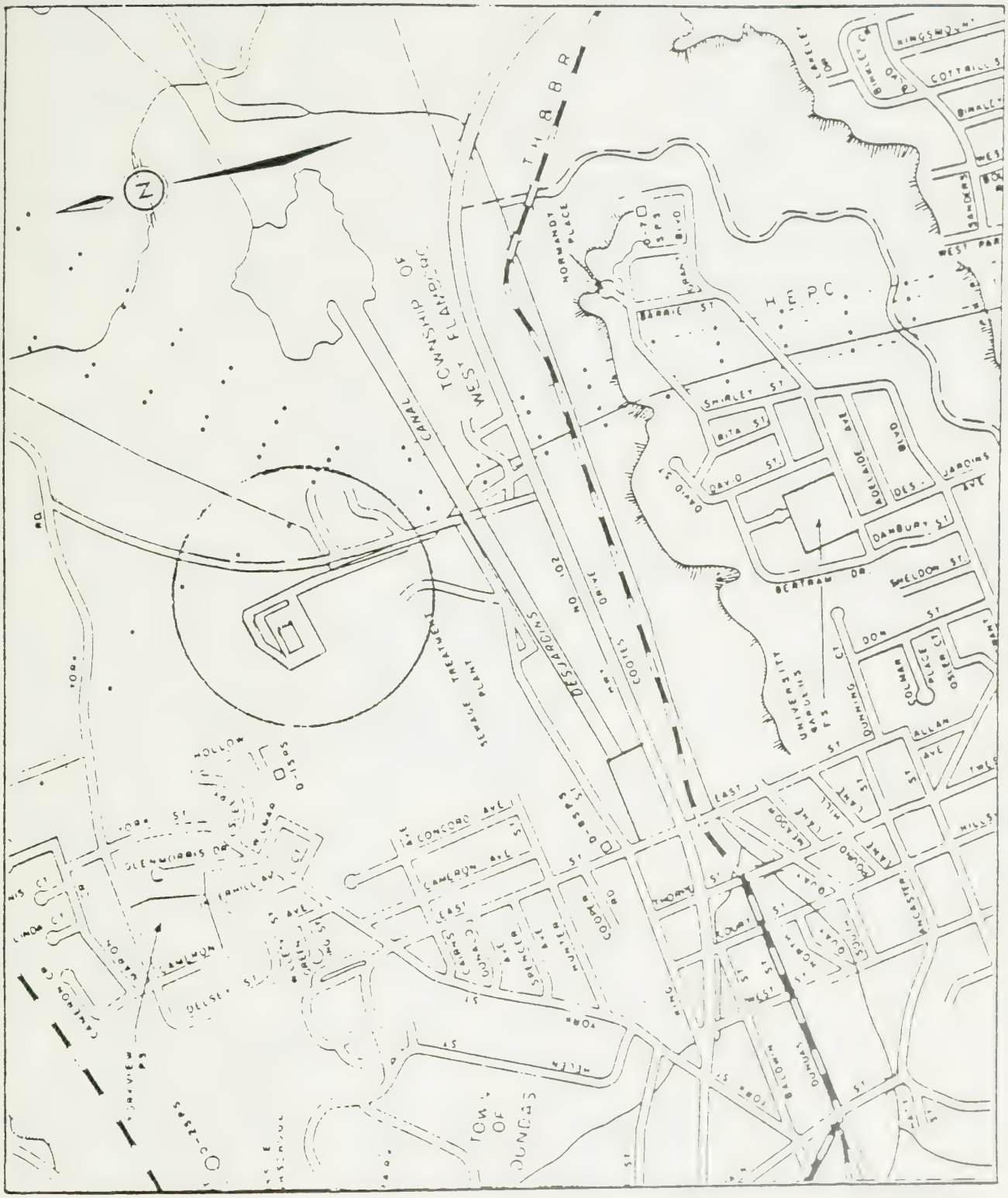
	NORTH BD. ON KENORA			EAST BD. ON BARTON E			SOUTH BD. ON KENORA			WEST BD. ON BARTON E			TOTAL VEH'S	PEDESTRIANS			
	L	S	R	L	S	R	L	S	R	L	S	R		N SIDE	E SIDE	S SIDE	W SIDE
	10	0	3	0	125	3	8	0	1	1	216	9	376	0	0	1	2
*	9	0	1	4	141	4	2	0	1	1	267	13	443	0	0	0	0
*	11	0	5	6	149	3	5	1	3	1	280	18	482	0	2	1	1
*	7	1	4	6	188	3	8	0	5	1	229	19	471	3	2	2	5
*	5	0	2	9	148	5	9	0	4	0	236	15	433	1	1	0	2
	5	0	5	15	131	2	9	1	8	2	199	22	419	0	1	0	2
	1	1	1	8	121	4	17	1	8	2	206	16	386	0	2	7	0
	7	0	3	7	128	0	5	0	8	2	176	18	354	1	0	5	2
	5	0	5	15	109	5	6	0	16	1	109	15	287	2	5	5	0
	5	1	1	14	115	4	12	0	10	3	132	16	313	0	0	3	3
	7	0	3	12	120	4	17	0	14	3	133	16	329	2	2	3	1
	4	1	5	16	118	5	8	0	11	1	114	13	296	0	1	0	0
*	8	1	8	20	185	4	28	0	19	3	189	12	477	4	8	4	4
*	3	0	6	14	183	8	15	0	12	7	159	16	423	0	2	6	5
*	11	0	4	20	198	6	14	1	8	7	216	18	503	2	10	4	7
*	10	1	2	21	177	9	22	2	18	3	177	17	459	0	2	8	10
	3	1	4	23	210	7	16	0	22	8	228	15	537	3	1	3	12
	10	2	5	24	219	14	17	2	13	2	217	19	544	1	3	4	2
	2	1	7	12	192	9	26	0	26	3	255	16	549	4	2	6	7
	9	0	8	13	202	11	10	0	17	5	130	13	468	4	1	12	2
*	11	0	9	18	268	11	16	0	22	3	214	11	583	3	4	10	5
*	9	1	8	13	312	15	26	0	14	5	230	10	643	3	2	14	0
*	8	0	7	5	267	7	31	0	15	9	256	11	616	1	6	14	0
*	5	2	6	10	310	18	18	3	11	11	206	12	612	0	4	6	0
	5	1	9	5	280	14	24	0	12	4	210	8	572	2	0	10	0
	7	0	8	5	266	15	14	3	8	10	194	7	537	1	4	4	0
	6	0	4	6	228	15	3	0	4	8	180	6	460	0	1	10	1
	4	0	6	4	192	11	5	0	5	4	148	2	381	0	3	2	0
L	187	14	139	325	5302	216	391	14	315	110	5556	384	12953	43	69	139	72
I		340	I		5843	I		720	I		6050	I	I		323		I

CITY OF HAMILTON TRAFFIC VOLUMES — TRUCKS ONLY

E	NORTH BD. ON KENORA			EAST BD. ON BARTON E			SOUTH BD. ON KENORA			WEST BD. ON BARTON E			TOTAL TRUCKS
	L	S	R	L	S	F	L	S	R	L	S	R	
5	0	0	0	0	9	0	3	0	1	1	12	5	31
0*	0	0	0	0	9	0	1	0	1	0	10	3	24
5*	0	0	1	0	10	1	2	0	0	0	14	4	32
0*	0	0	0	0	13	0	3	0	0	0	12	4	32
5*	0	0	0	0	13	1	4	0	1	0	13	3	35
0	0	0	0	0	15	1	5	0	2	1	20	5	49
5	0	0	0	0	20	0	4	1	0	0	31	4	60
0	1	0	0	1	15	0	3	0	1	0	30	7	58
5	0	0	1	4	18	1	3	0	6	0	17	3	53
0	0	0	0	1	20	1	3	0	0	0	21	5	51
5	1	0	0	1	18	1	3	0	1	1	27	3	54
0	1	0	0	7	12	0	2	0	1	0	19	3	45
5*	0	0	1	3	19	0	1	0	2	0	21	1	48
0*	0	0	0	2	21	1	2	0	1	0	15	2	44
5*	0	0	1	5	17	1	4	0	2	0	20	5	55
0*	0	0	0	4	23	0	4	0	1	0	19	2	52
5	0	0	0	2	20	0	1	0	0	0	12	4	39
0	0	0	0	2	21	0	1	0	1	0	23	2	50
5	0	0	0	0	11	0	1	0	0	0	27	0	39
0	0	0	0	0	17	0	2	0	3	0	12	0	34
5*	1	0	0	0	17	0	1	0	1	0	16	1	36
0*	0	0	0	1	18	0	2	0	1	0	21	2	45
5*	0	0	1	0	12	0	2	0	0	0	18	3	44
0*	0	0	0	1	11	0	1	0	2	1	11	2	33
5	0	0	0	1	8	0	1	0	0	0	2	1	14
0	0	0	0	0	7	0	0	0	0	0	7	0	15
5	0	0	0	0	7	0	1	0	0	0	11	0	19
0	0	0	0	0	5	0	0	0	0	0	5	0	10
L	4	0	5	35	304	8	57	1	27	4	444	74	1043
					429			88			522		

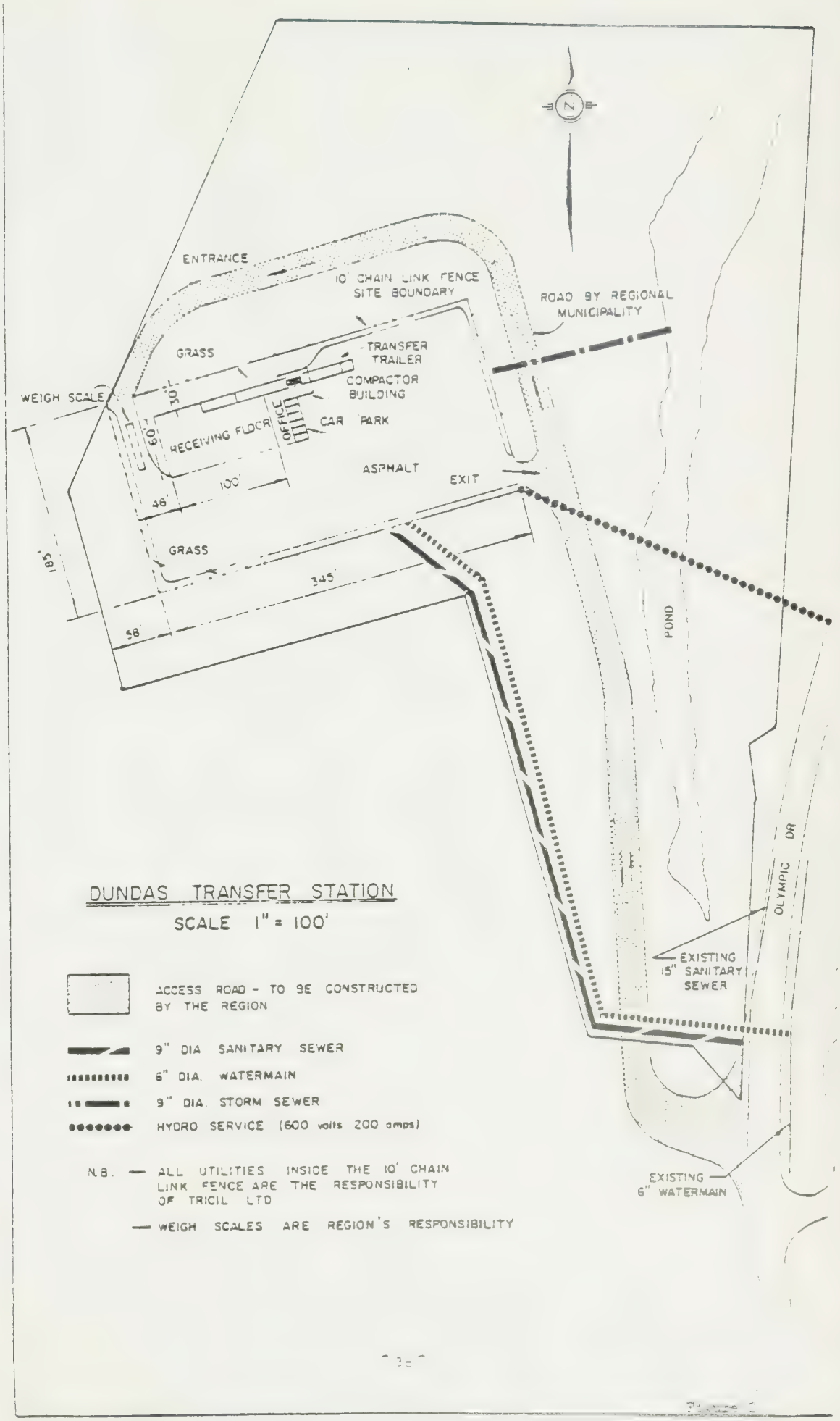
TABLE XXII

SECTION	ACCIDENT RATES (not including signalized (intersections) Hwy. 20- No. Accidents/			(average) A.A.D.T. /A.W.D.T.			ACCIDENTS PER MILLION VEHICLES MILES Accidents/MVM		
	1975	1976	1977	1975	1976	1977	1975	1976	1977
Centennial Parkway (Q.E.W. to HWY 8) (1.25 miles)	36	48	67	24168	24168	25497	3.40	4.54	6.01
Centennial Parkway (Hwy. 8 to King St.) (.65 miles)	16	19	32	18775	20592	20592	3.75	4.06	6.84
Highway #20 (King to Hwy 56) (3.1 miles)	33	30	-	15480 1974 M.T.C. Manual	17500 volume on hill 1976 M.T.C. Manual	-	1.97	1.58	-
Highway #53 (Upper Ottawa to Hwy 56) (2.3 m)	31	24	-	9125 Average 1974 + 1976	9800 1976 M.T.C. & Ham. Counts	-	4.22	3.00	-
Highway #56 (Hwy 53 to RR 22) (3.4 m)	25	21	-	5725 Average 1974 + 1976	7000 1976 M.T.C.	-	3.20	2.20	-
Highway #56 (RR 22 to Hald-Nor. Town Line) (3.5 m)	10	9	-	3534 Average 1974 _ 1976	4350 1976 M.T.C.	-	2.31	1.69	-



DUNDAS TRANSFER STATION
SITE PLAN

Figure 1



DUNDAS TRANSFER STATION

SCALE 1" = 100'

ACCESS ROAD - TO BE CONSTRUCTED BY THE REGION

9" DIA SANITARY SEWER

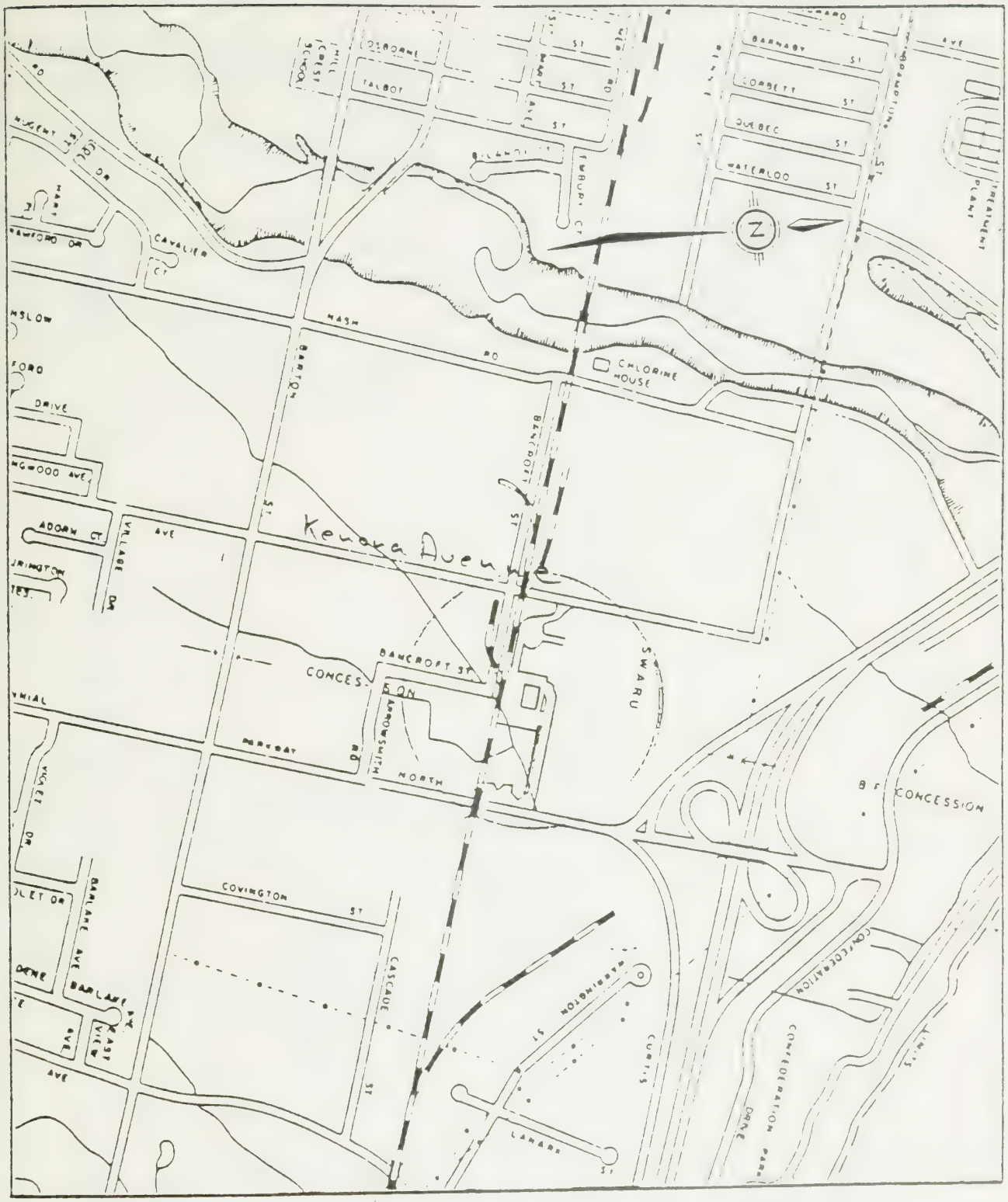
6" DIA. WATERMAIN

9" DIA. STORM SEWER

HYDRO SERVICE (600 volts 200 amps)

N.B. — ALL UTILITIES INSIDE THE 10' CHAIN LINK FENCE ARE THE RESPONSIBILITY OF TRICIL LTD

— WEIGH SCALES ARE REGION'S RESPONSIBILITY



KENORA AVE. TRANSFER STATION

SITE PLAN

Figure 3

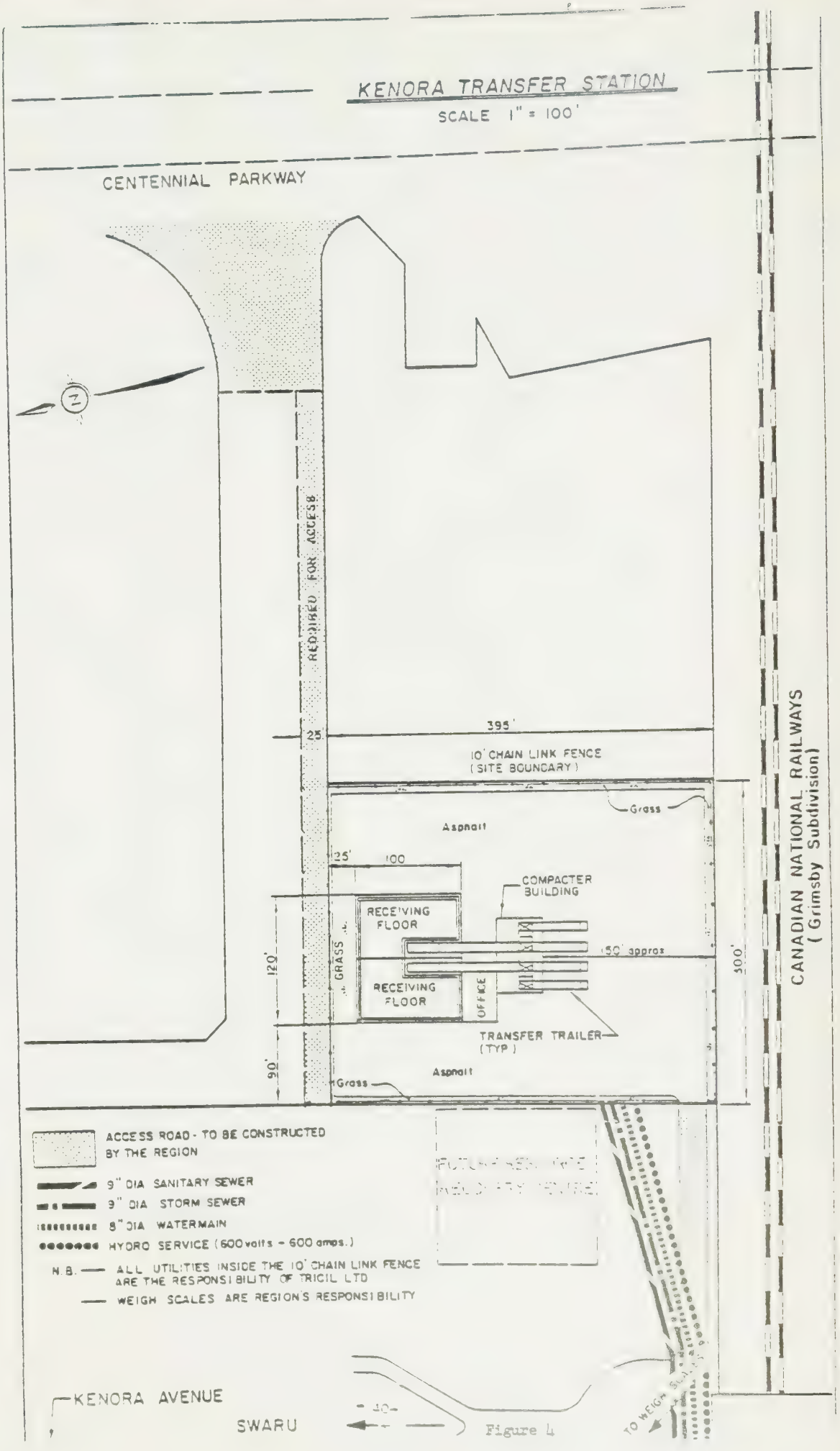
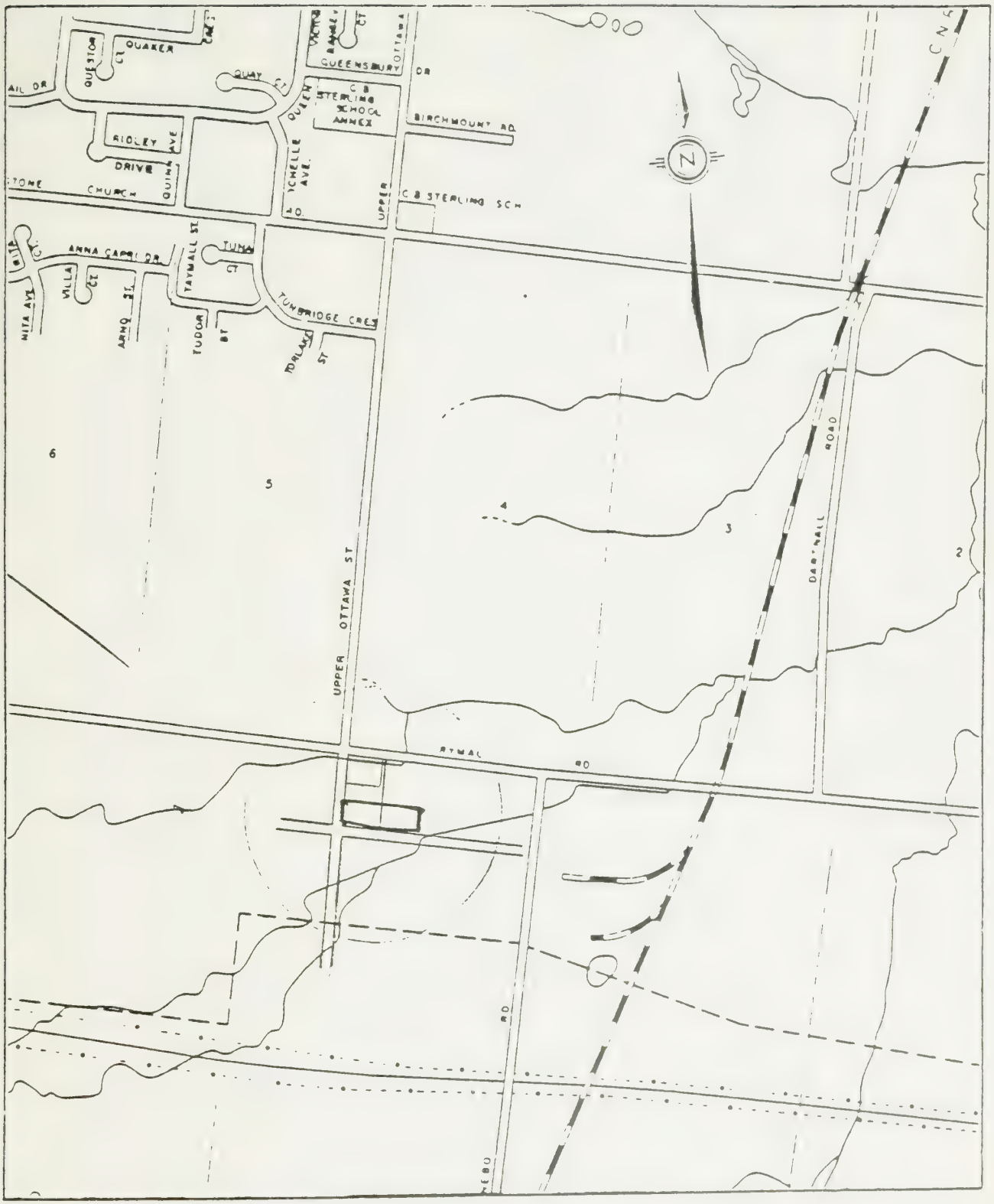

KENORA TRANSFER STATION
SCALE 1" = 100'
CENTENNIAL PARKWAY
REQUIRED FOR ACCESS
25'
395'
10' CHAIN LINK FENCE
(SITE BOUNDARY)
Grass
Asphalt
25'
100
COMPACTER BUILDING
RECEIVING FLOOR
150' approx
RECEIVING FLOOR
OFFICE
GRASS
120'
300'
TRANSFER TRAILER
(TYP.)
90'
Asphalt
Grass
CANADIAN NATIONAL RAILWAYS
(Grimsby Subdivision)
ACCESS ROAD - TO BE CONSTRUCTED BY THE REGION
9" DIA SANITARY SEWER
9" DIA STORM SEWER
8" DIA WATERMAIN
HYDRO SERVICE (600 volts - 600 amps.)
N.B. — ALL UTILITIES INSIDE THE 10' CHAIN LINK FENCE ARE THE RESPONSIBILITY OF TRICIL LTD
— WEIGH SCALES ARE REGION'S RESPONSIBILITY
KENORA AVENUE
SWARU
TO WEIGH SCALES

Figure 4



MOUNTAIN TRANSFER STATION

SITE PLAN

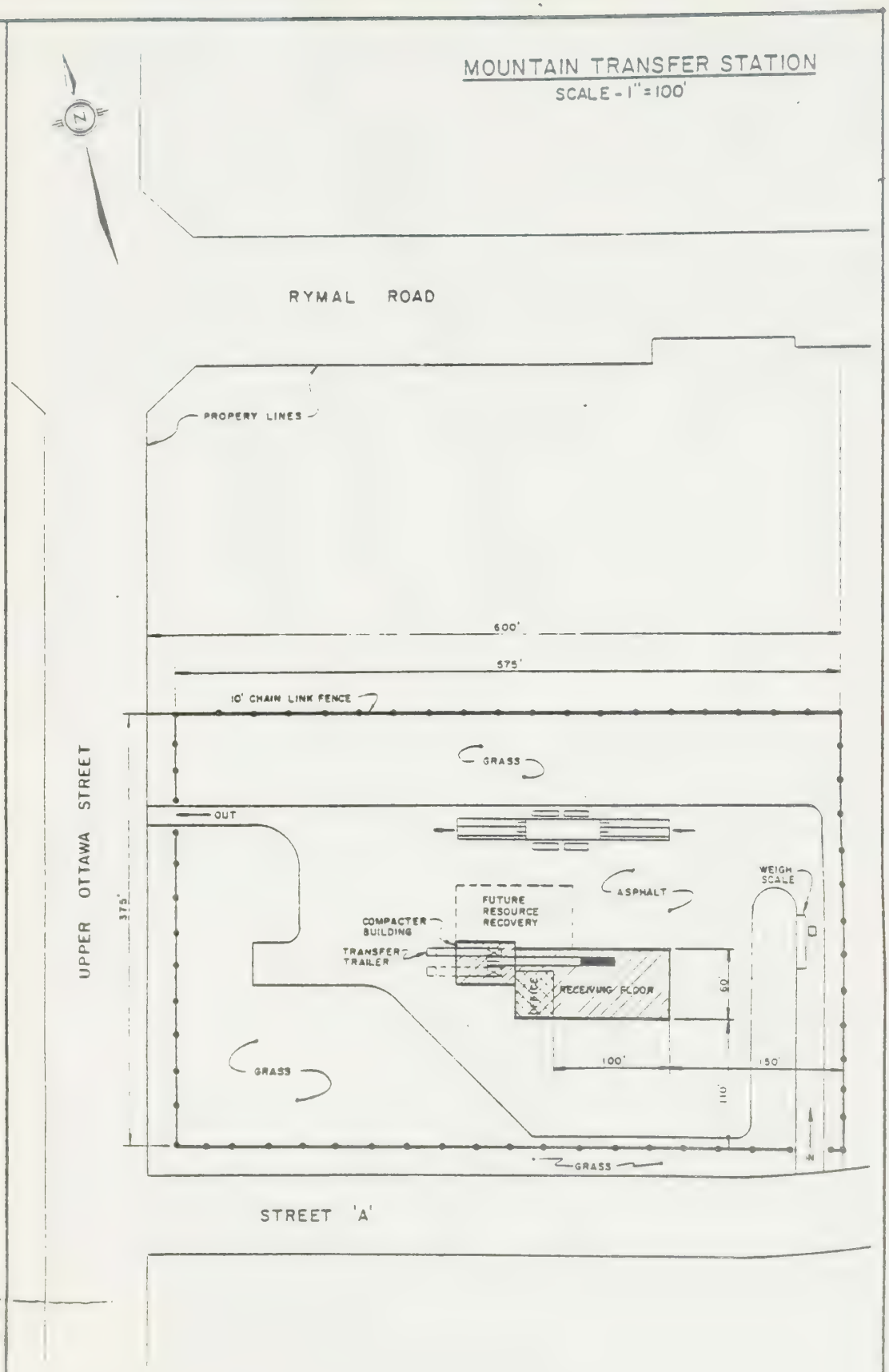


FIGURE 6

REV : 19 JUNE 78

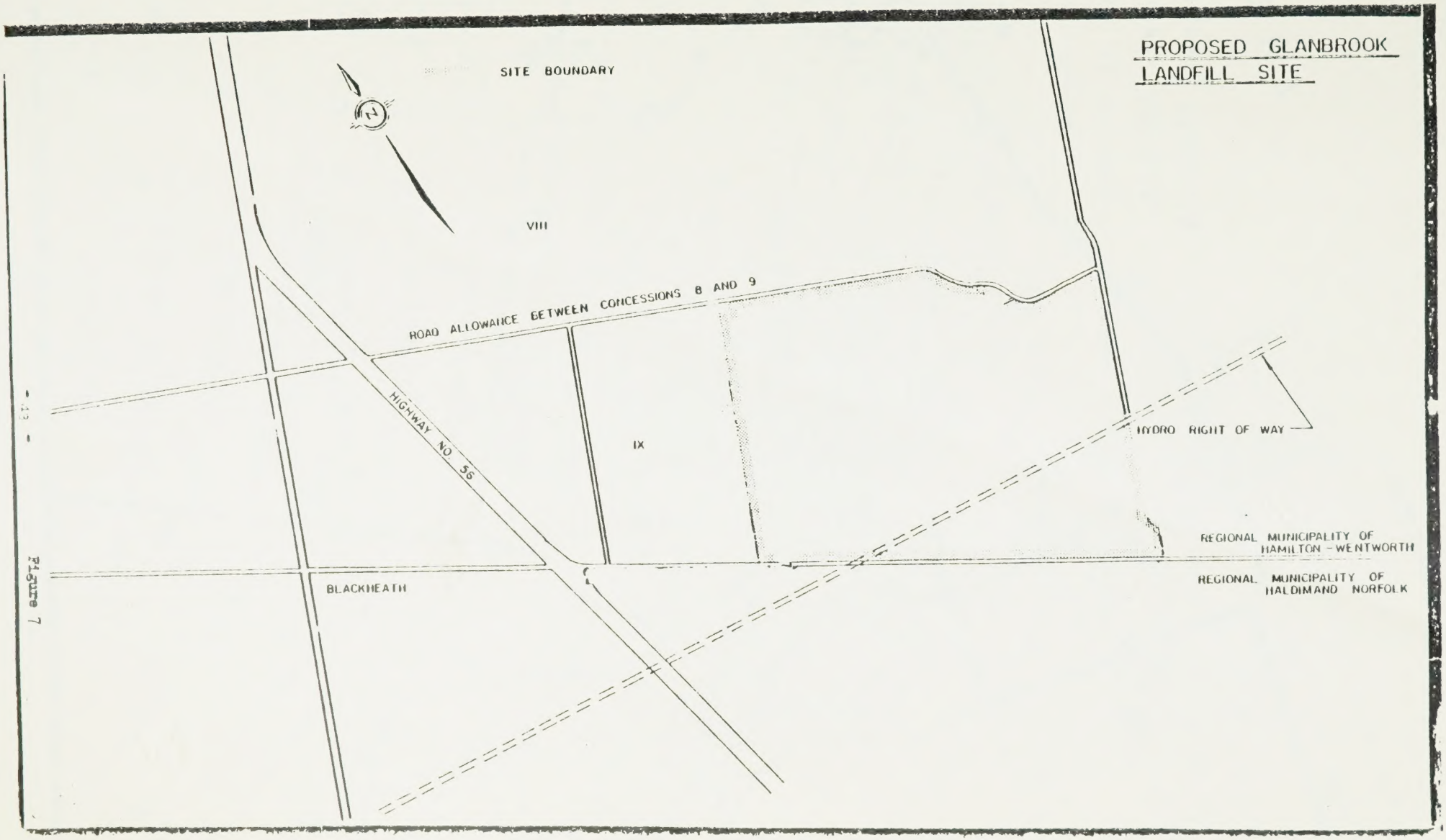

PROPOSED GLANBROOK
LANDFILL SITE
SITE BOUNDARY
VIII
ROAD ALLOWANCE BETWEEN CONCESSIONS 8 AND 9
HIGHWAY NO. 56
IX
HYDRO RIGHT OF WAY
REGIONAL MUNICIPALITY OF
HAMILTON - WENTWORTH
REGIONAL MUNICIPALITY OF
HALDIMAND NORFOLK
BLACKHEATH

Figure 7

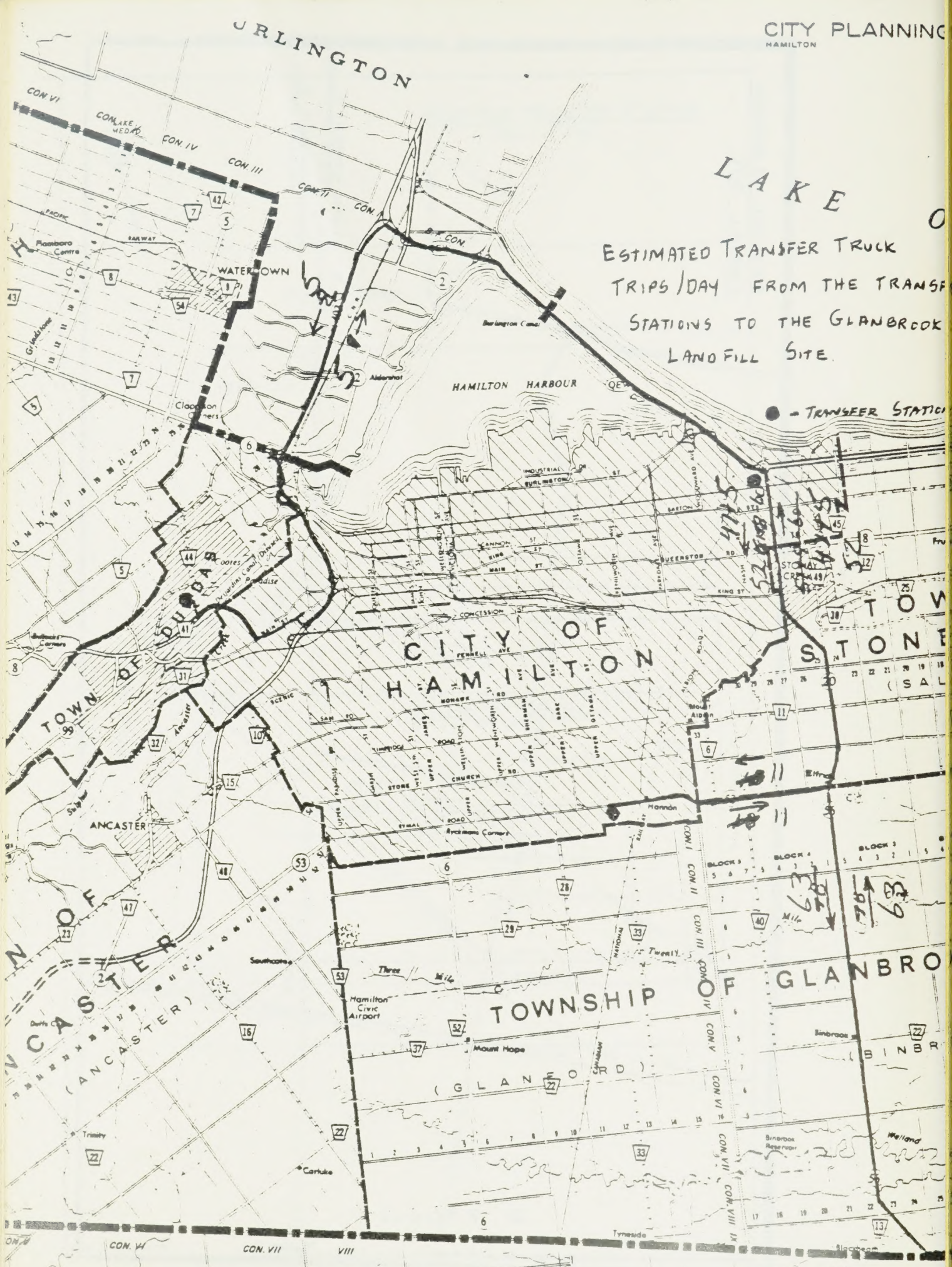

URLINGTON
LAKE
ESTIMATED TRANSFER TRUCK
TRIPS/DAY FROM THE TRANSF
STATIONS TO THE GLANBROOK
LAND FILL SITE.
● - TRANSFER STATIC
HAMILTON HARBOUR
CITY OF HAMILTON
TOWN OF DUNDAS
ANCASTER
TOWNSHIP OF GLANBRO
(GLANFORD)
Hamilton Civic Airport
Mount Hope
Waterdown
Flamboro Centre
Carluke
Binbrook
Tyneside
CON. VI
CON. VII
CON. VIII

Figure 8

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